BRADLEY L. MERNER, Ph.D.

(Curriculum Vitae)

James E. Land Assistant Professor | Department of Chemistry and Biochemistry, Auburn University | 179 Chemistry Bldg.Auburn, AL, USA 36849-5312 | OFFICE: 334-844-6910 | E-MAIL: blm0022@auburn.edu

PROFESSIONAL APPOINTMENTS

Auburn University

Assistant Professor (August 2013-present)
James E. Land Assistant Professor (July 2016-present)

Research Interest: Targeted-oriented chemical synthesis of complex organic molecules. Projects are initiated with the overarching goal of developing new tools for chemical synthesis, which are of general utility and provide access to challenging structural features of compounds relevant to medicinal chemistry as well as materials and nanoscale science.

Key Words: Macrocyclic compounds, strained aromatic systems, carbon nanotubes (CNTs), total synthesis, streamlined chemical synthesis, gene silencing therapeutics, antisense technology

Université de Montréal

Postdoctoral Research Associate
(2010-2013)
Advisor: Prof. Stephen Hanessian

EDUCATION

Memorial University (St. John's, NL, Canada)
Ph.D. in organic chemistry (*with distinction*)
(2010)
Doctoral thesis was selected as a finalist for the Governor General of Canada Award.
Advisor: Prof. Graham. J. Bodwell

Dissertation: Synthesis of 1,1,*n*,*n*-Tetramethyl[*n*](2,11)teropyrenophanes – Large and Highly Distorted Polycyclic Aromatic Hydrocarbons.

Memorial University (St. John's, NL, Canada)
B.Sc. Honors in Chemistry
(2004)

AWARDS/SCHOLARSHIPS

Memorial University Entrance Scholarship	2000
Parsons and Sons Scholarship for Excellence in AP Chemistry	2000
D. A. Andrews Memorial Scholarship for Physics	2000
Sobeys Inc. Scholarship	2000–2004
Dean of Science Honors List	2000–2004
Murray Brooker Scholarship for Excellence in Chemistry	2001–2002
Memorial University Dean of Science Book Prize for Chemistry	2002–2003
AstraZeneca National Undergraduate Scholarship for Chemistry	2003–2004
Memorial University Faculty of Science Lou Visentin Award	2004
University of Ottawa Travel Award National Undergraduate Chemistry Conference	2004
Sepracor Canada Award	2004
NSERC Postgraduate Scholarship: PGS D3	2005–2008
Memorial University School of Graduate Studies Dean's Excellence Award	2005–2008
Fellow of the School of Graduate Studies, Memorial University	2008
James E. Land Professorship in Chemistry and Biochemistry	2016-2019
National Science Foundation CAREER Award	2017-2022
Thieme Chemistry Journal Award	2018

PUBLICATIONS (*Independent Career*)

[17] Mitra, N. K.; Saha, N. K.; Johnson, K. F.; Merner, B. L. *An Investigation of the Scholl Reaction as a Strategy for Longitudinal pi-Extension of Benzenoid Macrocycles.* ***submitted***

[16] Dmytrejchuk, A. M.; Meudom, R.; Gorden, J. D.; Merner, B. L. *Regioselective Synthesis of Non-symmetric Pyrenes and a Strategy for Primary C2-alkylation.* ***submitted***

[15] N. K.; Mitra; Merryman, C. P.; Merner, B. L. *Unstrained Macrocyclic 1,4-Diketones to Highly Strained Arene-Bridged Macrocycles. Synlett* **2017**, *28*, 2205-2211.

- Invited *SYNPACTS* Article

[14] Mitra, N. K.; Corzo, H. H.; Merner, B. L. *A Macrocyclic 1,4-Diketone Enables the Synthesis of a p-Phenylene Ring that Is More Strained than [4]Cycloparaphenylene. Org. Lett.* **2016***, 18*, 3278-3281.

[13] Mitra, N. K.; Meudom, R.; Corzo, H. H.; Gorden, J. D.; Merner, B. L. *Overcoming Strain-Induced Rearrangement Reactions: A Mild Dehydrative Aromatization Protocol for the Synthesis of Highly Distorted p-Phenylenes. J. Am. Chem. Soc.* **2016***, 138,* 3235-3240

[12] Mitra, N. K.; Meudom, R.; Gorden, J. D.; Merner, B. L. *A Non-Cross-Coupling Approach to Arene-Bridged Macrocycles: Synthesis, Structure and Direct, Regioselective Functionalization of a Cycloparaphenylene Fragment. Org. Lett.* **2015**, *17*, 2700-2703.

- Selected as an ACS Editor's Choice Article (May 8, 2015)
- One of 10 most accessed articles for May 2015

PUBLICATIONS (*Graduate and Postdoctoral*)

[11] Salinas, J. C.; Migawa, M. T.; Merner, B. L.; Hanessian, S. *J. Org. Chem.* **2014**, *79*, 11651-11660. *Alternative Syntheses of (S)-cEt-BNA: A Key Constrained Nucleoside Component of Bioactive Antisense Gapmer Sequences.*

[10] Merner, B. L.; Unikela, K. S.; Dawe, L. N.; Thompson, D. W.; Bodwell, G. J. *Chem. Commun.* **2013**, *49*, 5930-5932. *1,1,n,n-Tetramethyl[n](2,11)teropyrenophanes (n = 7–9): A Series of Armchair SWCNT Segments.*

- This paper was selected as a "Hot ChemComm Article" by all referees
- This paper was highlighted in Synfacts, see: Swager, T. M.; Belger, C. *Synfacts*, **2013**, *9*, 841.

[9] Hanessian, S.; Wagger, J.; Merner, B. L.; Giacometti, R. D.; Østergaard, M. E.; Swayze, E. E.; *J. Org. Chem.* **2013**, *78*, 9064-9075. *A Constrained Tricyclic Nucleic Acid Analogues of α-L-LNA: Investigating the Effects of Dual Conformational Restriction on Thermal Duplex Stability.*

[8] Hanessian, S.; Schroeder, B. R.; Merner, B. L.; Chen, B.; Seth, P. P.; Swayze, E. *J. Org. Chem.* **2013**, *78*, 9051-9063. *Synthesis of cis and trans-α-L-[4.3.0]- Bicyclo-DNA Monomers for Antisense Technology: Methods for the Diastereoselective Formation of Bicyclic Nucleic Acid.*

[7] Hanessian, S.; Schroeder, B. R.; Giacometti, R. D; Merner, B. L.; Østergaard, M. E.; Swayze, E.; Seth, P. P *Angew. Chem. Int. Ed.* **2012**, *51*, 11242-11245. *Structure-Based Design of a Highly Constrained Nucleic Acid Analogue: Improved Duplex Stabilization by Restricting Sugar Pucker and the Torsion Angle γ.*

- This paper was selected by the Editor to be the Feature Communication in issue 45 of *Angew. Chem. Int. Ed.* 2012 (frontispiece)

[6] Wu, J. I.; Cyraoski, M. K.; Dobrowolski, M. A.; Merner, B. L.; Bodwell, G. J.; Mo, Y.; Schleyer, P. vR. *Mol. Phys.* **2009**, *107*, 1177-1186. *On the Aromatic Stabilization Energy of the 4Nπ-Electron Pyrene.*

[5] Merner, B. L.; Dawe, L. N.; Bodwell, G. J. *Angew. Chem. Int. Ed.* **2009**, *48*, 5487-5491. *1,1,8,8-Tetramethyl[8](2,11)teropyrenophane: Half of an Aromatic Belt and a Segment of an (8,8) Single-Walled Carbon Nanotube.*

- This paper was selected as a VIP (Very Important Paper) by all three referees
- Featured on the inside cover of the journal

- The subject of a Highlights article in *Angewandte Chemie International Edition*: Steinberg, B. D.; Scott, L. T. *Angew. Chem. Int. Ed.* **2009**, *4*8, 5400-5402.

[4] Dobrowolski, M. A.; Cyraoski, M. K.; Merner, B. L.; Bodwell, G. J.; Wu, J. I.; Schleyer, P. vR. *J. Org. Chem.* **2008**, *73*, 8001-8009. *Interplay of π-Electron Delocalization and Strain in [n](2,7)Pyrenophanes.*

[3] V. M.; Arns, S.; Merner, P. M.; Warford, C. C.; Merner, B. L.; Scott, L. T.; Bodwell, G. J. *Org. Lett.* **2006**, *8*, 5195-5198. *Benzo[a]acecorannulene: Surprising Formation of a New Bowl-Shaped Aromatic Hydrocarbon from an Attempted Synthesis of 1,2-Diazadibenzo[d,m]corannulene.*

[2] Aprahamian, I.; Bodwell, G. J.; Fleming, J. J.; Manning, G. P.; Mannion, M. R.; Merner, B. L.; Sheradsky, T.; Vermeij, R. J.; Rabinovitz, M. *J. Am. Chem. Soc.* **2004**, *126*, 6765-6775. *Reduction of Strained Polycycles: How Much Strain Can a Pyrene Anion Take?*

[1] Lai, R. Y.; Fleming, J. J.; Merner, B. L.; Vermeij, R. J.; Bodwell, G. J.; Bard, A. J. *J. Phys. Chem. A.* **2004**, *108*, 376-383. *Electrogenerated Chemiluminescence. 74. Photophysical, Electrochemical, and Electrogenerated Chemiluminescent Studies of Selected Nonplanar Pyrenophanes.*

PATENTS

[1] Seth, P. P.; Swayze, E. E.; Hanessian, S.; Merner, B. L.; Wagger, J.; Giacometti, R. D.; Tricyclic Nucleosides and Oligomeric Compounds Prepared Therefrom. US Patent Application No. 61/621,855; 103 pp. Filed on April 9, 2012.

[2] Seth, P. P.; Swayze, E. E.; Hanessian, S.; Merner, B. L.; Giacometti, R. D.; Schroeder, B. R. Tricyclic Nucleoside Analogues. US Patent Application No. 61/621,851; 129 pp. Filed on April 9, 2012.

BOOKS AND BOOK CHAPTERS

[1] *Design and Strategy in Organic Synthesis: From the Chiron Approach to Catalysis*, Hanessian, S., Giroux, S.; Merner, B. L., Wiley-VCH, Weinheim, Germany, 2013 [ISBN 978-3-527-31964-0].

[2] *Strategies and Tactics in Organic Synthesis*, Volume 13, Michael Harmata Editor. Chapter: "Cross-Coupling Free Biaryl Bond Formation." Merner, B. L. 2018. ***In preparation***

REAEARCH PRESENTATIONS (**PI**)

CONTRIBUTED RESEARCH PRESENTATIONS

[1] *Annulations in Curved Spaces: A Bottom-up Approach to Carbon Nanotubes*, SERMACS 2014, Nashville, TN, October 16-19, 2014. General Organic Chemistry III Symposium.

[2] *Synthesis of functionalized benzenoid macrocycles: Templates for carbon nanotube synthesis,* 249th ACS Denver, CO, March 22-26, 2015. New Reactions and Methodologies Symposium.

[3] *Strategies for the synthesis of 1,2 and 1,4-Arene-bridged macrocycles: Model templates for a bottom-up chemical synthesis of carbon nanotubes* 98th CSC, Ottawa, ON, June 13-17, 2015.

[4] 2015 Physical Organic Chemistry GRC, Holderness, NH

[5] *Functionalized 1,4-arene-bridged macrocycles: Precursors to functionalized CPPs*, The IUPAC International Symposium on Novel Aromatic Compounds (ISNA-16), Madrid, Spain July 5-10, 2015.

[6] 2016 Stereochemistry GRC, Salve Regina

[7] 2017 Physical Organic Chemistry GRC, Holderness, NH, June 25-30.

[8] 2017 17th International Symposium on Novel Aromatics (ISNA-17), Stony Brook, NY, July 23-28.

INVITED RESEARCH PRESENTATIONS AND LECTURES (PI)

[1] Tennessee Technological University, Cookeville, TN (April 17, 2015)

[2] Samford University, Birmingham, AL (September 3, 2015)

[3] Louisiana State University, Baton Rouge, LA (September 15, 2015)

[4] Clemson University, Clemson, SC (November 12, 2015)

[5] University of South Alabama, Mobile, AL (January 22, 2016)

[6] 251st Meeting of the American Chemical Society, San Diego, CA; *Supramolecular Chemistry: A Crown and Anchor Approach* Symposium (Mach 16, 2016)

[7] The 2nd International Symposium on Curved Aromatic Pi-Systems (CURO-Pi II), Eugene, OR (September 12, 16).
[8] Georgia State University, Atlanta, GA (November 7, 2016)
[9] Georgia Institute of Technology, Atlanta, GA (November 8, 2016)
[10] Emory University, Atlanta, GA (November 9, 2016)
[11] University of Mississippi, Oxford, MS (March 2, 2017)
[12] Mississippi State University, Starkville, MS (March 3, 2017)
[13] University of Miami, Coral Gables, FL (October 6, 2017)
[14] Washington University, St. Louis, MO (November 2, 2017)
[15] Southern Illinois University, Carbondale, IL (November 3, 2017)
[16] University of Georgia, Athens, GA (March 8, 2018)
[17] Florida State University, Tallahassee, FL (Fall 2018)
[18] University of Nevada, Reno, Reno, NV (Fall 2018)

FUNDING

[1] National Science Foundation Faculty Early Career Award (2017-2022)
Functionalized Bent para-Phenylenes: New Strategies and Tools for the Synthesis of Carbon Nanotubes
CHE-1654691
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Amount: $699,993